

THE LEISURE HOUR.

A FAMILY JOURNAL OF INSTRUCTION AND RECREATION.

"BEHOLD IN THESE WHAT LEISURE HOURS DEMAND,—AMUSEMENT AND TRUE KNOWLEDGE HAND IN HAND."—COOPER.



SHE APPEARED AS IF STEERING TO INTERCEPT US.

A MYSTERIOUS COLLISION AT SEA.

In the year 184—the writer went out to Bombay, for the purpose of joining the fleet which was stationed in the East Indies, in the good ship "Amphitrite," when a somewhat mysterious event occurred to vary the monotony of an ordinary voyage round the Cape.

It was a lovely day early in the month of February, and the ship was bowling along "close hauled," with a splendid breeze. We were nearing the Line, and had lost the north-east monsoon which blows with varying force all the year round north of the equator, and were

fortunate in having fallen in with a good steady south-easterly wind, that promised to last some time, and carry us perhaps into southern latitudes; for we had experienced a long run of bad weather in the "chops of the Channel." The winter had been unusually severe, and the gales during the months of November and December very frequent. After a great deal of knocking about, we felt the more pleased with the change. As I was saying, there was a fine spanking breeze—what is called by sailors a "topgallant breeze;" that is, when the ship can just carry well her topgallant sails. The beautiful morning had given place to as beautiful an afternoon;

the sea was smooth, with a long swell; and the dancing waves, with their crests just ruffled by the wind and tipped with foam, came tumbling one over the other in a joyous way, as if running a race to meet the ship; but, on encountering the opposition of the bows, these "white horses" speedily succumbed, and, after an angry buffet against the stern, disappeared in the black depths under her bilge.

The "Amphitrite" was a new ship, marked A 1 at Lloyd's, of 1800 tons burden, and this was her first voyage; she was clipper-built, and the fastest vessel I ever sailed in. We never looked out for ships astern, but, whenever a sail was sighted, it was always ahead, and before night fell we were certain to leave her hopelessly behind. Many a storm and gale have I experienced on board her, and right nobly she always behaved in them, riding over the waves in spite of the immense weight aloft of the heaviest and squarest spars ever fitted to a ship of her size. Once in a hurricane, when we were lying to quite snugly, a large China trader went down before our eyes.

On the 10th of February, the day of which I am writing, the "Amphitrite" was sailing with her yards "braced sharp up" on the port tack, and every stitch of canvas was drawing, she having all "plain sail" set. The passengers (myself among the number) were all standing on the poop, talking and joking, and looking forward to doing justice to a good dinner, for which this pleasant sea-breeze gave us an appetite. On a long sea-voyage dinner is the great event of the day, to which every one looks forward as breaking the tedious monotony in an agreeable manner. The heat of the day had been great, although tempered by a double awning spread over the poop, under which we had placed our easy chairs, and, with our books in our hands as a make-believe, we enjoyed the sweets of the *dolce far niente*. Conversation naturally turned on crossing the Line and its attendant ceremonies, which were pretty generally spoken of as follies, especially by some young cadets going out to join the army, who were looking forward, half with feelings of curiosity and half of dread, to the advent of Neptune with his motley crew and bucket of slush. Of all senseless customs and traditions, this Line folly is about the most unreasonable. There can be no harm in the sailors dressing up and blundering through a performance, but the manner in which passengers often are ill-used is monstrous. This nuisance is now considerably abated, and it is hoped will soon entirely cease to disgrace the mercantile marine. Few respectable merchant-captains allow their passengers to be thus insulted. The practical joking is frequently used as a means of extorting money from timid people, who would pay anything rather than be subjected to ill-treatment.

Three or four of the cadets had expressed their determination to join together for the purpose of resisting any attempt to make merry at their expense, when suddenly the look-out man on the fore-yard sang out, "Sail ho!"

"Where away?" was the query from the officer of the watch on the quarter-deck.

"On the port bow," was the rejoinder.

The mate then asked what he made her out to be; and the reply was that she looked like a full-rigged ship, but, as she was coming down before the wind, he could not make out for certain what her rig was. The captain, being informed of this, soon came upon deck, with his long glass, and tried to find her. We, all of us who possessed telescopes, went on the forecastle, and swept the horizon forward, but could see nothing; but this

was to be accounted for from the fact of her not having yet appeared above the horizon. However, in a few minutes we made the white sail out, like a speck in the far distance. The ladies now came upon deck, and the remainder of the passengers; for it is wonderful what an interest the sight of a ship creates among people wearied of seeing nothing but sea and sky—only "water, water everywhere." It is always an event to be marked in the log-book, and duly chronicled in the diaries of the "cuddy" passengers; and we had seen nothing lately on the waters except the ordinary sea-birds that follow in the wake of a ship, picking up whatever will fill their maws, and which, sometimes flying, sometimes settling on the waves, are at first a source of amusement, and give rise to discussions as to where their home among this wild waste of waters may be.

The breeze was freshening, and soon we were gratified by a nearer inspection of the stranger. We found that she was a square-rigged ship, with all sail set, royals and studding sails below and aloft and on both sides. "She walked the waters like a thing of life," and came down before the wind like a race-horse, with the foam curling away from her bows. There are few more beautiful sights than a fine ship heeling over under full sail, with the copper on her weather-side showing, and every stitch of canvas bellying out to catch the favouring breeze. The ladies were admiring her beautiful proportions, and the fine effect of the setting sun as it lit up her sails and glistened along her sides, painted black, but relieved with white ports. All hands now crowded up as the word was passed that the strange ship wished to speak; for she appeared as if steering to intercept us. Nearer she came and nearer, and, now that we could see her so well, the passengers retired to the poop, there to be out of the way, and the better to hear all that was said. The captain sent his boy down to his cabin for the speaking-trumpet, and we began speculating as to her nationality, for we could not see any flag flying. Some of the young cadets, having probably more money than they knew what to do with, began laying bets as to whether she was English or Swedish; for the quartermaster, an old salt, said she was a Swedish-built ship. To induce her to show her colours, we hoisted the ensign, and then eagerly watched for a response. But no "bit of bunting" fluttered up to her mizen peak; and one of our number, the doctor, who was rather romantically inclined, conjectured she might be a "rover free."

The wind was now blowing freshly; but the ship still carried her royals and studding sails, and still came bearing down on us. We altered our course a point, just to see whether she really did wish to speak, and the stranger appeared to follow suit. This seemed to decide the captain as to the ship's intention of communicating with us, but yet she persisted in not showing her colours—a most unusual thing on the high seas, where common courtesy dictates an exchange of flags; and, what was still more strange, we could see no indication of life on her decks, for there were no heads peeping above the bulwark or the rail of her forecastle. The look-out man, who had a bird's-eye view of her, on being hailed, said he could see no one on board.

There is a "law of the road" at sea, as there is on shore among drivers of vehicles; and it is this: ships on the port tack, sailing near the wind, give way to vessels on the starboard; and ships running before the wind yield the pride of place to any they may encounter close-hauled on either tack. Now, we being "full and by," that is, close-hauled, it was the duty of the

stranger, in case of an accident, and to avoid a collision, to put her helm a-port and get out of our way. I mention this to exculpate us from all blame as to what followed. We, not expecting anything, but being still under the impression she had something to communicate, kept on our course; but it soon became evident that her captain intended passing almost too near us for safety. If he had his ship well in hand, however, he might with ease prevent any disaster arising from our proximity. Some dark clouds were rising up, the wind blew now strong and in gusts, and we could not imagine how the other skipper could be so insane as to keep his topgallant studding sails set.

Being soon within hailing distance, our captain raised the speaking-trumpet to his mouth, and shouted out, in a stentorian voice, "Ship ahoy! What ship's that?" No answer. "Ship ahoy!" again rang over the waters. Still no reply to the summons. "What does this mean?" said the captain to the first mate and a knot of passengers, myself among the number, standing by him on the break of the poop. We all looked at one another, and then at the ship anxiously. What indeed could be intended by this silence? Was it a ruse to carry out some diabolical purpose? It was dusk, and stories that I had read, when at school, of the "Flying Dutchman," and other old sea-legends, involuntarily recurred to me and raced unbidden through my brain. Not a soul could be seen on her decks, which were now distinctly visible. "Ship ahoy!" for the third time Captain H—— bellowed out, and then ran off the poop on to the quarter-deck; for it was now awfully certain there must be a collision. "Put the helm hard up!" he shouted out to the quartermaster as he descended the ladder; but it was too late. I saw how it was to be, and caught hold of the cross-jack lifts to steady myself. Like lightning the huge mass of wood and tall spars and towering canvas struck us full on the port bow, a blow that caused every timber and plank in the vessel to creak and groan with the concussion. So terrific was the shock that our ship seemed absolutely to stand still as if aghast; the masts and yards shook and reeled like a forest of trees when blown by the passing gale; and the sails for an instant were thrown flat aback, in spite of the fresh breeze that was bellying them out and stretching the canvas to its utmost tension.

I saw that several of the crew and passengers were thrown down; and, as is usual on such occasions, the ladies fainted right and left. Some only wrung their hands, and screamed in an agony of terror; but the gentlemen hurried them all down indiscriminately into the cuddy—not a very safe place, certainly, if we were going to founder; but there was confusion enough on deck without its being "worse confounded" by the persons of insensible ladies, young and old. When the ship struck us on the port bow her bowsprit was right over our decks. At the last moment, when it was too late to be of much service, our helm had been put "hard up," thereby paying the "Amphitrite's" head off. Instead, therefore, of the stranger steering alongside of us, she carried on her way, with her huge bower anchor, the flukes of which were hanging over the side, tearing all along our bulwarks, carrying away "dead-eyes" and "lanyards," and laying the ship's side open. Up aloft matters were much worse; for the yards, and studding-sail booms, and all the gear were caught in inextricable confusion, and came rattling about our ears; most of the spars, fortunately for the safety of those below, falling overboard. The noise of the creaking timber and tumbling booms and yards was terrific.

Nothing could be done; for the two ships had each great way on them, and it was patent they would soon clear each other, even if all the masts were to go "by the board" in the struggle. Three of our men were seriously injured by the falling débris, and had to be carried below; one poor fellow with both legs broken.

In the meantime how had our opponent fared through all this business? One of her studding-sail yards fell on the poop with its sail, and the spar, falling "end on," dashed a hole through the deck, nearly knocking my brains out at the same time. Her foretopmast went like a reed, carrying with it the maintop-gallant-mast and the jibboom; but all this luckily fell clear of us into the water. The most singular thing of all, however, was the fact that not a soul could be seen anywhere on board her—neither on the look-out, nor on the decks, nor on the poop; and, what was incomprehensible, there was no one at the wheel. She seemed like a ship of the dead. Had we chosen, we could have jumped on board her with ease as, in her mad career, she tore along our whole length, from the "cathead" to the "boomkin," where was fitted the "pennant" of the main brace, and which, as a parting salute, she broke short off like a carrot. Everybody seemed for the moment paralysed, and took shelter until the storm of falling wreck and blocks had subsided.

The stranger presently dropped astern, after having done us all this mischief; and we could then see that she was a large ship of 1000 or 1100 tons burden, of English build, and deeply laden. She looked a perfect wreck, with her rigging all hanging about, and her "top hamper" trailing in the water, mixed up with gear and sails. All this happened in much less time than I take to narrate it, and in a few seconds a fine ship was reduced to this pitiable condition. However, our thoughts were chiefly centred on our own safety; and the first thing to discover was whether we were in a sinking state or no. The captain immediately ordered the carpenter to sound the well. On doing so he reported that there were eight inches of water; and, as this was only an addition of two inches above the usual amount, we were much relieved. A party was told off to the pumps, and all watched with anxiety to see whether the water gained on us. The boatswain piped "Hands clear wreck!" and up aloft streamed the topmen to send down the stumps of the shattered masts and clear the tangled ropes.

It was fast getting dark, and, now that our immediate safety was assured, we turned our thoughts to the stranger. When she first sheered off us all her sails were flat aback, and she was evidently without guidance, and just "forging" ahead slowly through the water; but she again soon fell off before the wind, and ploughed along her watery way as before.

We could see the ship a long way astern, and, as we passengers were talking and discussing the collision, suddenly one of our number exclaimed, "Hullo! I can't make her out now." We looked, and she was gone. The spot she occupied a moment before was vacant. We strained our eyes, but in vain: nothing could we see but the rising waves, and the clouds overhead now threatening an approaching gale. We went to the captain and informed him of the sudden disappearance of the strange ship; but he answered he had quite enough on his hands to occupy himself and all his crew, without lowering a boat and sending her, he did not know how far astern, on such a Quixotic errand. He said it was getting dark, and looked like bad weather ahead, and he must make all snug aloft before the gale came on. Besides, said he, to put an end to our remonstrances, it must have been all a mistake; it was so dusk that we had

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lost sight of her position; and she was probably all right, and we, no doubt, all wrong in our conjectures as to her having foundered. It was of no use arguing with him. We were firmly convinced that the unfortunate ship had gone down, as all of us were looking in her direction and saw her distinctly only a few seconds before her disappearance. The quartermaster on duty, whose attention was in no way taken up with the refitting of the wreck, afterwards corroborated our statements and ideas as to the end of the unlucky vessel. He expressed no opinion then, for he did not feel himself called to express a different view of the question from the captain. Every one agreed that there was not a creature on the decks anywhere when the two ships were in collision, with one exception, and that was the above-mentioned petty officer, who declared that he saw, just before she dropped so far astern as to render her wheel invisible, a man running up on deck from below to the after-part. If this were so, it would account for her sails filling again.

The whole affair was shrouded in mystery, and we never discovered anything about her. To this day I know not what was her name, her country, or whither she was bound, and probably never shall. When we arrived in the East Indies, two months after this affair, the captain made no inquiries respecting the fate of the ship, and I subsequently discovered forbade his officers speaking about her to any one ashore or afloat. He could not stop our tongues, however, and for a long time this strange occurrence was the fruitful source of conversation. After the first shock, the imaginative young ladies launched out into all manner of romantic notions with respect to her. There was much ground for speculation and discussion, although we could learn nothing fresh thereby. Had the ship, having sprung a leak, been deserted by the crew while becalmed on the Line, and then the unfortunate seamen, considering they had no time "to shorten sail," abandoned her with all sail set? and had a breeze subsequently sprung up and driven her in wild unguided career over the trackless sea, until she fell athwart our hawse and so met her destruction? Was it so? or had the crew risen in mutiny against the captain and officers, and, after binding or murdering them, abandoned themselves down between decks to drunken dissipation, and, revelling in unwonted freedom from control, left the ship to take care of herself? If what the quartermaster stated he saw really took place, the last was the more probable supposition. But whether this was the case, or whether the fresh water had given out and the ship's company taken to the boats as I have stated, we never discovered.

The whole affair was inexplicable, one of those unsolved mysteries that sometimes come across the path of those wayfarers who "go down to the sea in ships, that do business in great waters." How many a gallant bark has left a foreign port with her crew all full of life, and looking forward to the day when the white cliffs of old England would gladden their eyes, and the warm pressure of the hand of loved ones cheer their hearts, before they again encounter the perils and hardships of a sea life! and then what do we hear? It is known that she sailed out of port one morning with a favouring breeze, the crew rousing up the harbour echoes with their capstan song, causing many an exile on shore to heave an envious sigh at the good luck which takes them home, but leaves him still to pine in a foreign land. But then days and weeks lengthen out into months, and we read in the papers how at Lloyd's the insurance on the missing ship has been raised to an ominous figure. Still no tidings reach the anxious home of sorrowing friends,

and gradually sickening hope gives place to fell despair; and hearts fail; and mayhap one, the true and constant, whose happiness is wrapped up in the welfare of him whose body, tossed hither and thither on the cruel waves, has long, long ago been food for the fishes, slowly breaks; and the poor young wife, so lately full of love and pride, is borne to an early and untimely grave in a quiet country churchyard, far from him she loved so well in life.

This, perhaps, was one of those mysteries of the deep. Although the captain acted wrongly, as I think, on this occasion, my readers must not infer that he was unfeeling. Far from it, he was very kind to his crew, and always bore a character as a humane man; but it was clearly his duty to lower a boat, or rather to return on the track of the stranger, and, if he could not make her out in the darkness, to lie by the spot where she was last seen till morning would enable him to prosecute his search. He was right as to the weather; for it soon came on to blow a gale of wind, and we were under double-reefed topsails before midnight. Although much strained, the "Amphitrite" made little water, and we repaired our damages aloft, and were soon all right again. On arriving in port the ship had her "top-sides" looked to and repaired, and all signs of the "collision at sea" were effaced.

C. R. L.

LEAD, LEAD SHEETS, LEAD PIPES,
LEADEEN SHOT.

It is probable that lead, looking to the comparative facility with which it is won from the mine, smelted from the ore, and modelled into any form which it is capable of assuming, was the first of the metals which was utilized by man. However this may have been, it is certain that the use of lead is of very ancient date; it being mentioned by Moses, in the 31st chapter of the book of Numbers, among the other metals, only five in number, that seem to have been then known. The Babylonians were familiar with its use, and applied it as coverings to their broad terraces. The Egyptians often enclosed the mummied relics of their sovereigns in leaden coffins. The Greeks and Romans applied the same yielding metal to nearly all the purposes for which it could then be made available; and the latter people especially carried on a large commerce in lead, which they obtained from the countries they conquered, and especially from Great Britain. It is supposed, from certain indications yet traceable in the neighbourhood of mines, that, even before the Roman invasion, the ancient Britons worked, and even trafficked in lead, with other peoples who visited these shores for the purpose. The evidence is, however, much more clear that the Romans wrought the British mines abundantly; so much so, that it has been inferred that they sent hence large quantities of the metal to their own country. Pigs of lead have been found, and are to be seen in the British Museum, stamped with the names of the emperors Domitian and Adrian, and with short inscriptions in Latin; and in the vicinity of many of the mines the remains of Roman stations, dwelling-houses, baths, and burial-places are to be traced at this day.

During the medieval ages lead appears to have ranked among the highest of the metals used for building purposes and for decorative art. It was the roof-covering of the grand Gothic cathedrals and the castles of the feudal barons; it formed the net-work and tracery of the gorgeous church windows; and in many instances it took the place of iron, and was beaten cold

with the hammer of the artificer into a thousand beautiful forms, as ecclesiastical screens, tomb enclosures, gargoyle, and finial ornaments. It further took the place of marble, and, under the hands of the sculptor, or rather modeller, assumed the stately forms of saints, and canonized heroes, and benefactors. Then also, as before and since, it was largely used for purposes of sepulture; kings, potentates, and warriors being encased in lead on being consigned to their last resting-place.

Lead is very widely distributed throughout the British islands. The oldest mines, or, at least, those which we know to have been worked the longest, are in the neighbourhood of Wirksworth, in Derbyshire, the working of which can be traced back as far as the year A.D. 714. At the present time the most productive mines are situated in the great mineral chains of the North of England—in Northumberland, Cumberland, Durham, and York. Other English mines, almost equally productive, are worked in Devonshire and Cornwall. In Scotland lead is found in great abundance in the "lead-hills" on the borders of Lanarkshire; and Ireland has mines in Wexford county, Donegal, Armagh, and in the mountains of Wicklow.

There are several kinds of lead found in these islands, and, indeed, the list comprises as many as ten different varieties. The lead ore of commerce is, however, the variety which is most profitable to the manufacturer, to which mineralogists have given the name of "galena," and which contains from seventy to eighty per cent. of pure metal: a fine specimen of this galena, presented by the Duke of Devonshire, may be seen in the Geological Museum, in Piccadilly. The value of this mineral, however, is not determined so much by the percentage of pure lead which it will yield to the smelter as by the quantity of silver it contains. All British lead contains silver in greater or less quantities, and, as the precious metal is easily separated from the lead, it is that which fixes the value of the ore. Thus ores which are equally productive of lead will occasionally differ a full half in value, and even more; the prices having been known to vary as much as from seven to twenty pounds the ton.

Silver may be extracted from the lead in two ways; either by oxidizing the lead by means of heat, and removing the oxide as fast as it forms, or by a process of crystallization. The latter method, which was discovered by Mr. Pattinson, of Newcastle, about thirty years ago, and introduced by him at the Durham mines, is the one now generally followed. Mr. Pattinson remarked that, when melted lead was cooling, minute crystals began to be formed on the surface, and that, as soon as they took their complete shape, they sank slowly to the bottom. He inferred, from their sinking, that they were pure lead, containing no silver, and thus gravitated by their weight. This was found to be the fact, or nearly so, the crystals containing silver only in very small proportions. In carrying out his process the lead is heated until it is entirely fluid, then cooled; as it is cooling, the crystals are taken out in perforated ladles, which allow the uncrystallized portions to run through; then the crystals are again melted, and again drained by straining through the ladles; and the same is done a third time. The uncrystallized portion is now so rich in silver as to contain from two to three hundred ounces per ton of metal. This rich metal is then cast into small pigs, and is subjected to a process called *cupellation* in a blast furnace, where the lead, being a base metal, is oxidized and removed, and where the silver, being a precious metal, falls down into the *cupel*, or vessel prepared for

its reception. The oxide of lead, or *litharge*, produced by cupellation, is restored to its metallic state by heating it in contact with carbonaceous matter, and is in no respect damaged, as to its use, by parting with its silver.

The quantity of silver derived from the lead produced in the island of Great Britain amounts to near one million ounces per annum, and, valued at five shillings the ounce, is worth nearly £250,000. The lead of the southern mines yields a much greater quantity per ton than that of the north, and the silver produce of Cornwall exceeds one-fourth of the whole amount. The yield of the lead-mines of these islands is about one hundred thousand tons of ore per annum, giving over seventy thousand tons of metal, the entire value of which may be taken at £1,000,000.

Sheet-lead, an article of extensive use, and for which there is an unceasing demand, is sometimes cast upon a flat table, having a bed of iron or sand, with a ledge running round the edges. The fused metal is first transferred from the furnace to a three-cornered vessel of iron placed at the head of the table, from which it is poured. The metal is then spread evenly over the whole surface by means of a bar placed across the table and resting on the ledges, the thickness of the sheet being regulated by the distance between the lower side of the bar, or *strike*, and the table. By moving the *strike* forward the lead is made to cover the table, and the surplus, if any, falls into a vessel at the foot of the table. The above mode of making sheet-lead was general until the late improvements in steam machinery, and it is still much practised by working plumbers in country places. But the mass of the sheet-lead consumed is now made with greater rapidity and precision by the action of the rolling-mill. The first step in rolling sheet-lead is to mould a plate of the metal, which shall be six or seven feet square, and six inches thick, in a cast-iron mould or frame. This enormous mass, weighing seven or eight tons, as soon as it has sufficiently cooled, is hoisted from its bed by a powerful crane, and swung upon the rolling-table. This table is a portentous-looking affair, being a massive frame or bench, seventy or eighty feet in length, and eight feet broad, and rising some three feet from the ground. About the middle of the table are fixed two large and exceedingly powerful cast-iron rollers, which are made to revolve at an easy rate, in contrary directions, under the impetus of steam. A double row of wooden rollers is placed along the whole length of the table to support the plate of lead as it travels to and fro through the cast-iron rollers; an ordeal which it has to undergo some hundreds of times before it is reduced to the requisite dimensions. By the prodigious pressure the huge block of metal is squeezed like a lump of cheese, and, after being reduced to the required thickness, and multiplied many times in length, it is finally cut up into slabs, each of which is rolled up separately, weighed, stamped, and tied up with rope-yarn, in which condition it is ready for the market.

The manufacture of lead pipes has of late years undergone a still greater improvement than that of sheet-lead. The first lead pipes that were used were made much in the same manner as gun-barrels are now—by welding or fusing the metal in short lengths round a mandril, and afterwards soldering such short pipes together. This was the ancient Roman method, and it is followed even now in some of the northern countries of Europe. A second and much improved method was to draw a very thick pipe by main force through collars of successively smaller dimensions, until it was elongated,

and reduced to the required diameter. By the first of these operations a pipe of five or six feet in length might be made, longer ones being formed by soldering these together end to end. By the second operation pipes of twenty and even thirty feet in length could be formed; and this method is much in use now where such short lengths of piping only are required. The last improvement in lead-pipe making, however, and the one which may be regarded as final, for it is incapable of much greater perfection, is the process of drawing lead pipes by means of hydraulic pressure. By this method the lead, in a half-fused state, is forced through a cylinder the diameter of which is the outer diameter of the piping, and inside of which is a steel mandril or core which forms the inside of the pipe. The hydraulic press, the force of which no soft metal can resist, propels the lead over the mandril, and through the delivering cylinder, which thus in a manner spouts forth leaden piping, finished and ready for use, and of any length that may be needed. As fast as it is made it is coiled round a reel made to revolve at such a rate as to match the quantity of piping produced.

The leaden shot of the sportsman was, up to a comparatively late date, cast in moulds, as leaden bullets are now; though of course not singly, as bullets sometimes are. The very first process of metal casting we ever witnessed was performed by an old Suffolk farmer, whom we saw, in the fierce winter of 1814, casting his own shot for the replenishing of his leather sporting-belt. The impressions made by the witnessing of a mechanical process on the mind of a child of eight or nine years of age are perhaps not much to be relied on after the lapse of fifty years; but we distinctly recollect that the mould the old farmer used resembled a pair of pincers whose jaws were some nine inches in width. The moulds for the shot were sunk in the flat sides of these jaws, and may have been some thirty in number; so that every time the pincers were dipped in the metal-pot thirty shots were cast. How the shots were treated afterwards, or what treatment they required before they were ready for use, we cannot now recall. Long before the time of which we speak, however, lead shot was made by a process very different from casting, and which, indeed, closely resembles the natural process by which rain is converted into hail. The inventor of this new method was one Watts, a plumber of Bristol, and he is said to have received his first idea of it while asleep in his bed. He dreamed that he was walking abroad in a shower of rain, but that, instead of water which came down from the clouds, it was molten lead, and he saw, to his surprise, that the drops as they fell were perfectly globular. In order to test the idea of his dream he poured some melted lead from the top of the tower of St. Mary's Church, Redcliffe, into some water below. The experiment was crowned with success, and the result was that the dreaming plumber sold his invention for a large sum of money.

The lead shot of the sportsman are now, and have been for the last fifty years, all made by this process. As, in order to ensure success, the fluid metal must fall from a considerable height, shot-wells have been dug, and shot-towers erected, both furnishing sufficient altitude for the fall. On visiting a shot-tower we find that the height of the shaft is not less than two hundred feet. To reach the top, where the melting and launching of the metal takes place, we have to climb a circular iron staircase lighted only by a glimmer from above, and affording but a narrow footing not at all satisfactory to a nervous subject. Landing near the top, we find ourselves in a circular dusty apartment, where a single

figure is bending over the melting-pot with a number of pigs of lead lying around him on the floor. In the centre of the floor is an open trap-door, and far above our head, in a line directly over it, is another; for we have arrived only at the first melting-room, which is used for the formation of the smaller sizes of shot; a greater fall than is obtained from this elevation being necessary for the shot of largest size. The rough walls of this room are crusted all over with a foul greenish deposit, which is a mixture of sulphur and arsenic, the sulphur emanating from the lead in fusing, and the arsenic being added in certain proportions for the sake of at once hardening the metal and ensuring its more complete sphericity. These poisonous fumes have a sad effect upon the health of those destined to inhale them continually; and thus shot-casting adds another instance to the list of fatal results attending our industrial processes. Placed right over the trap-door, and supported in an iron frame, is a small vessel aptly termed a "colander," being about twelve inches in diameter, and furnished with a handle. The bottom of this vessel is pierced thickly with holes, the size of the holes determining the size of the shots to be formed; and they differ, of course, in different colanders, varying from one-fiftieth of an inch in diameter for large shot, down to one-three-hundred-and-sixtieth for the very smallest. The dimensions of the holes are, of course, very much smaller than those of the shot produced, the fluid lead passing through the holes in fine threads, and forming into globules in the course of their descent. We note that the operator does not pour the fluid metal into an empty colander: he tells us that, if he were to do so, it would flow too fast, and the result would not be shot in any quantity, but rather long, elliptic, and irregularly-shaped pieces of metal. Therefore he first covers the bottom of the colander with a layer, tolerably thick, of the dross or oxide of lead taken from the surface of the melting-pot, and does not pour in his charge until he has proved by experiment that he has interposed a sufficient quantity of this stuff, and no more, to regulate the flow. Then he ladles out the lead pretty rapidly, and, as it flows through in a continuous stream, we hear it plunging into the deep water-vat placed for its reception below.

There is not much more to see in this grim sky-parlour, and, after looking round us for a few minutes, we begin to retrace our steps down the spiral staircase. We have not descended much more than half the distance when the voice of our friend above is heard in a shout of warning to those below, and the next moment down comes another charge of the liquid metal. The fall is accompanied by a sharp hissing sound, and it has the appearance of a dazzling cataract of glistening silver, startlingly beautiful to look at, yet forcing one to recoil instinctively from its terrible swoop. As the stream plunges into the water below the noise might be compared to a thousand or two volunteers maintaining a continuous fire from their rifles.

At the bottom we find the men removing the shot from the tub, which, shining like silver, are carried off to the drying-room, where they are dried upon iron plates heated by steam. The method of separating the imperfect shot from the perfect ones is ingeniously simple. The whole are strewed about along the upper part of an inclined plane formed by a slab of smooth iron tilted at a certain angle: the well-formed round shot roll down rapidly in straight lines, and bound over the edge of the slab into a bin placed beneath to receive them; while the shreds and pieces of metal not globular move in various directions with a zig-zag motion, and, not acquiring sufficient impetus to overleap

the ledge, are deposited in a receptacle at the end of the incline.

The shots, which shone like silver on being taken from the water, assume a white frosted appearance after being dried. The sorting of them is the next process, and it is accomplished by means of a machine made somewhat on the principle of the flour-dressing machine, and which, while the shot revolves in perforated cylinders, deposits the several sizes in their respective bins.

The final process in their manufacture is that of blackening and polishing. This is done by putting several hundredweights of the shot at a time into a cast-iron barrel, together with a certain quantity of black-lead powder; the barrel is then stopped tight, and made to revolve rapidly by means of the steam-engine. When taken from the barrel, the shots are smoother, more globular, and have changed their frosted white hue for the shining jet-black appearance with which everybody is familiar. Nothing now remains to be done save to pack them, and sew them tightly up in stout canvas bags weighing twenty-eight pounds each—a business which is mostly accomplished by women, whom we find at the work in a large room appropriated to them.

There are twelve sizes of shot known to sportsmen, and which are designated by their numbers. The largest, called also swan-shot, is nearly as large as a common field-pea; the smallest, or No. 12, called sparrow-shot, is less than the smallest pin's head. A still smaller size than this is made at some shot-factories which is not bigger than grains of sporting gunpowder, and is prized by naturalists and collectors, who use it on their travels for shooting butterflies and small tropical birds, which would be torn to pieces if struck by shot of average size.

SIR JOHN F. W. HERSCHEL, BART.,

K.H., M.A., D.C.L., F.R.S., M.B.I.A., F.R.A.S., ETC., ETC.

AMONG modern English scientific men, no name has attained a higher rank in the estimation of the public than that of Herschel. From May 11, 1780, to the present time the Philosophical Transactions of the Royal Society, as well as the Proceedings of kindred societies, have been enriched with papers bearing that illustrious name. Rarely do we see such hereditary scientific talent as that exhibited by the two Herschels, father and son; for each has received the highest honours from his fellow-workers in science. The original circumstances of these two great philosophers were, however, widely different; for, whereas Sir William Herschel, by his great genius and application, succeeded in transferring himself from comparative obscurity to the proud position of being the most celebrated astronomer of the age, his son, Sir John Herschel, has had the advantage of the highest university training, which, in conjunction with his personal scientific tastes, has enabled him to develop those great mathematical powers which have so materially assisted him in his inquiries. This combination of high education with an extraordinary natural talent for communicating his thoughts to the world in an elegant and attractive manner, has been the means of making him so distinguished a philosopher of modern times.

John Frederick William Herschel was born at Slough, near Windsor, on March 7th, 1792. His father, Sir William Herschel, K.C.H., had a few years previously gained much celebrity by his discovery of the planet Uranus. Sir William was a Hanoverian, and is said to have accompanied the band of the Hanoverian regiment of Guards to England, about the year 1759. After

undergoing several privations, he was engaged by Lord Durham as musical instructor to the band of an English regiment then quartered on the borders of Scotland. He soon obtained an engagement as organist at Halifax, which he afterwards exchanged for a similar but more lucrative appointment at Bath, where he first showed a taste for astronomical observations. It was in this city that Sir William Herschel wrote his first papers, which were read before the Royal Society on May 10, 1780—“Astronomical Observations of the Periodical Star Mira Ceti,” and “Observations relating to the Mountains of the Moon.” His great discovery of the planet Uranus in 1781 soon brought him into the foremost rank of scientific society; a position which he retained till his death in 1822, in the eighty-fourth year of his age.

At the usual period of life young Herschel entered St. John's College, Cambridge, from which he graduated B.A. in 1813 as senior wrangler, having for competitors the late Dr. Peacock, Dean of Ely, who was second wrangler, and the late Rev. Fearon Fallows, formerly astronomer at the Cape, the third wrangler. The names of several other noted men appear in the honour-list as contemporary students; among others, we may mention the late Professor Mill, Dr. Robinson, Master of the Temple, and Bishop Carr, late of Bombay. Mr. Herschel had no sooner attained his degree than he forwarded a mathematical paper to the Royal Society, “On a Remarkable Appearance of Cotes's Theorem.” This communication was published in the Philosophical Transactions. In the same year he was elected a Fellow of the Royal Society, and, although so young, became an active member of that learned corporation. The date of his election into the Royal Society is May 27, 1813.

The early researches of Mr. Herschel were chiefly confined to pure mathematics. For these mathematical papers, published by him in the Philosophical Transactions, the Copley Medal was awarded in 1821. After the death of his father in 1822, “observing” astronomy, that practical branch which descended to him as a hereditary duty, occupied his chief attention. This occupation did not, however, prevent him from associating with others in forming a new society, for the general advancement of astronomical science. A few years previously to the death of Sir William Herschel, in consequence of the great improvement in the construction of astronomical telescopes, many amateur astronomers sprang up, who took great interest in the accurate observation and delineation of the heavenly bodies. It was considered by a select few of the Fellows of the Royal Society that the time had come when it was expedient to form a society to be exclusively dedicated to the encouragement and promotion of astronomy. The first suggestion was made by the late Dr. Pearson; but Mr. Herschel, who was one of the preliminary committee, drew up an address, which is considered to be the first publication of the present Royal Astronomical Society. The success of the new association did not, however, diminish the interest which Mr. Herschel always felt for the parent society, the duties of one of the secretaries of which he fulfilled from 1824 to 1827.

The principal class of astronomical inquiry on which Mr. Herschel was occupied at this period of his career was the observation of the angular distances and positions of the double and triple stars, and the positions of nebulæ and clusters of stars. These researches occupied many years of his life. Some of the first results of his labours appeared in an elaborate treatise, published jointly by Mr. (now Sir James) South and himself, for which the Astronomical Society awarded a gold medal to each astronomer. This work was succeeded at

intervals by no less than six catalogues, the number of double stars varying from 284 to 2007 in each.

Those of our readers who have had no experience in continuous astronomical observing during the long nights of winter can have but a slight conception of the anxious toil to which the astronomer is subject. When this labour is, however, undertaken for no other object than a sincere love for the science, and for no other reward than the satisfaction of having contributed to the advancement of knowledge, the self-sacrifice calls for special honour. The objects to observe which Mr. Herschel so devotedly gave up his time required a calm atmosphere for their proper definition, which could scarcely ever be obtained during convenient evening hours. From experience, Mr. Herschel found that the best time for the observations was between midnight and sunrise. In winter distinct vision often came on an hour or two before midnight. This continuous night-work requires good health and a strong constitution. Mr. Herschel evidently felt the severity of his labours; for, in discussing his double-star observations, he has remarked, that "Should I be fortunate enough to bring this work to a conclusion, I shall then joyfully yield up a subject on which I have bestowed a large portion of my time, and expended much of my health and strength, to others who will hereafter, by the aid of those masterpieces of workmanship which modern art places at their disposal, pursue with comparative ease and convenience an inquiry which has presented to myself difficulties such as at one period had almost compelled me to abandon it in despair."

In 1831 Mr. Herschel received the honour of knighthood from the hands of King William, in acknowledgement of his eminent scientific services.

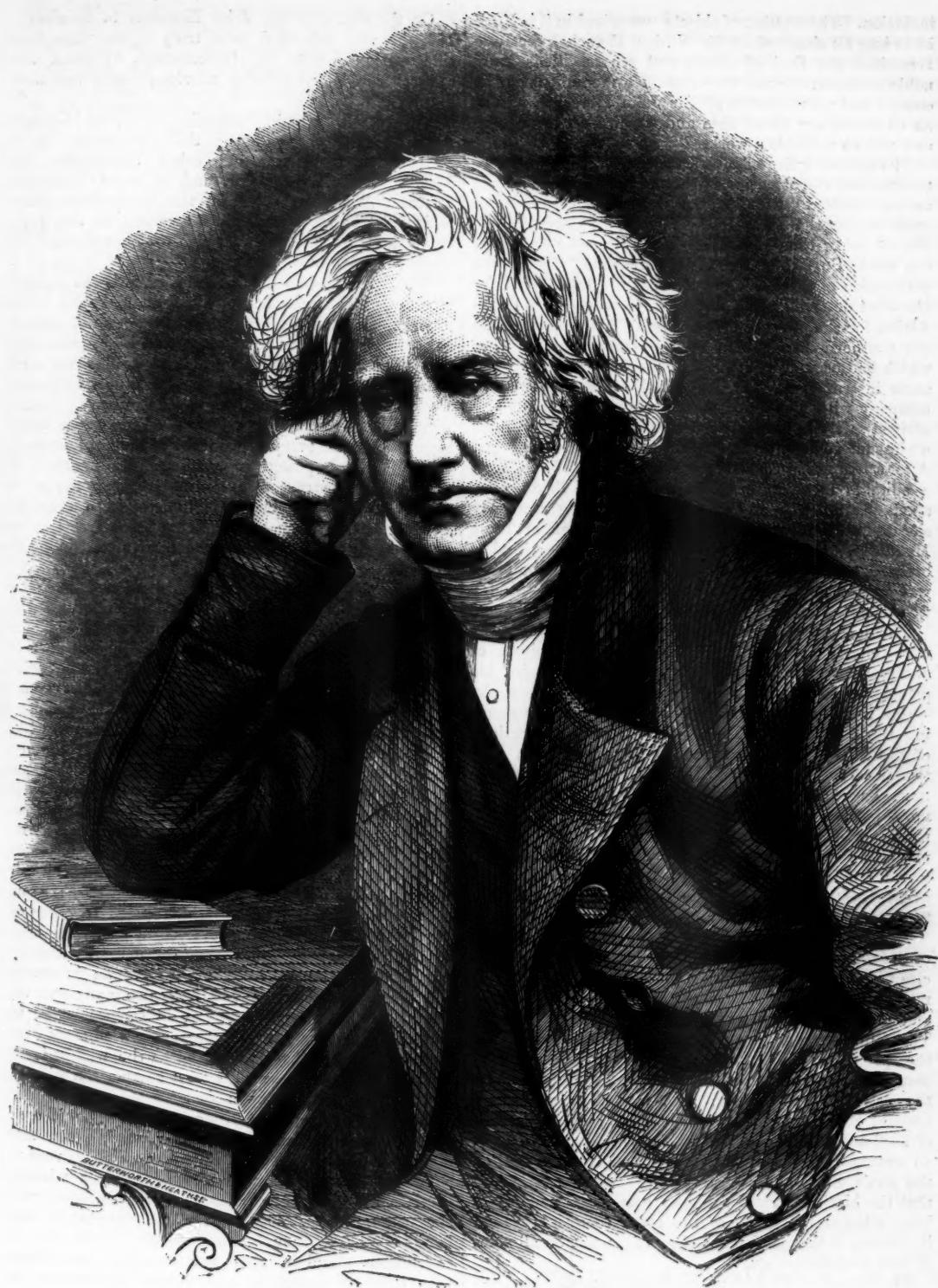
In 1833 Sir John Herschel was awarded the royal medal of the Royal Society for his paper "On the Investigation of the Orbits of Revolving Double Stars." The following extract from the address of the President, the Duke of Sussex, gives a graphic account of these labours:—"Sir John Herschel has devoted himself, as you well know, for many years at least, as much from filial piety as from inclination, to the examination of those remote regions of the universe into which his illustrious father first penetrated, and which he has transmitted to his son as a hereditary possession with which the name of Herschel must be associated for all ages. He has subjected the whole sphere of the heavens within his observation to a repeated and systematic scrutiny. He has determined the position and described the character of the most remarkable of the nebulae. He has observed and registered many thousand distances and angles of position of double stars, and has shown, from the comparison of his own with other observations, that many of them form systems whose variations of position are subject to invariable laws. He has succeeded, by a happy combination of graphical construction with numerical calculations, in determining the relative elements of the orbits which some of them describe round each other, and in forming tables of their motions; and he has thus demonstrated that the laws of gravitation, which are exhibited, as it were, in miniature in our own planetary system, prevail also in the most distant regions of space; a memorable conclusion, justly entitled by the generality of its character to be considered as forming an epoch in the history of astronomy, and presenting one of the most magnificent examples of the simplicity and universality of those fundamental laws of nature by which their Great Author has shown that he is the same to-day and for ever, here and everywhere."

It is impossible to give any analysis of the results, or even the titles, of the numerous researches which have occupied the time of Sir John Herschel at various periods. From a rough list of his papers, but which is evidently incomplete, it appears that, out of seventy, twenty-eight are on astronomical subjects; thirteen on optics; ten on pure mathematics; eight on geology; and eleven on miscellaneous science, as chemistry, photography, etc. In addition to the preceding, most elaborate articles on the theories of light and sound have been published in the "Encyclopædia Britannica." The article "Meteorology" in the latter work has been republished separately, and is acknowledged to be the best English treatise on the subject. The Admiralty "Manual of Scientific Inquiry," for the use of officers in the Royal Navy, was brought out under his direction.

There are, however, two of his great astronomical works to which we must refer in more detail. These are, first, his great catalogue of nebulae and clusters, published in the Philosophical Transactions for 1833, for which the gold medals of the Royal and Astronomical Societies were awarded in 1836; and, secondly, results deduced from his observations made at the Cape of Good Hope. For the latter work Sir John Herschel received the Copley medal for the second time from the Royal Society, and an honorary testimonial from the Astronomical Society.

The interest which Sir John Herschel has always exhibited in the minute details of the nebulae and double stars must be considered as a result of his association with his illustrious father; and his familiarity with the instruments necessary for the observations doubtless originated from the same source. Hence, probably, the reason why so long a period of his observing time was devoted to this section of astronomical research. One of his first communications to the Memoirs of the Astronomical Society is an account of the great nebulae of Andromeda and Orion, accompanied by an admirable engraving of the latter. From 1825 to 1833 nearly all his astronomical energies were given to this kind of observation. The catalogue of nebulae and clusters previously mentioned contains a list of 2500 nebulae, etc.; the right ascensions and declinations of all these objects are determined, the general character of their appearance recorded, and all those which present any very extraordinary shape or constitution, of which there are nearly 100, are drawn with a delicacy and precision which is worthy of an accomplished artist. The present Astronomer-Royal, on presenting the gold medal of the Astronomical Society to Captain Smyth, on behalf of Sir John Herschel, who was then residing at the Cape of Good Hope, remarks that, "One of the most important parts of this work is the division containing the engraved representations of the most remarkable nebulae. The peculiarities which they represent cannot be described by words or by numerical expressions. These drawings contain that which is conspicuous and distinctive to the eye, and that which will enable the eyes of future observers to examine whether secular variation is perceptible. They are, in fact, the most distinct and most certain records of the state of a nebula at any given time."

Successful as this work was in 1833, Sir John Herschel has himself lately superseded it by the publication in the Philosophical Transactions of a greatly enlarged catalogue of nebulae and clusters of stars. This splendid work was read before the Royal Society on November 19th, 1863, and contains all the nebulae and clusters which have been anywhere described, and identified in position sufficiently to warrant their



J. F. W. Herschel

inclusion. The number of objects comprised in it is 5078; including all observed by Sir William Herschel, Sir John Herschel, the Earl of Rosse, and others. This truly noble undertaking will ever remain a monument of the energy and perseverance of Sir John Herschel, who at an advanced age found time and inclination to arrange and edit so valuable a work.

The second series of investigations to which we desire to draw especial attention is that described in the unique volume entitled "Results of Astronomical Observations made during the Years 1834—1838 at the Cape of Good Hope; being the Completion of a Telescopic Survey of the whole Surface of the Visible Heavens." After the publication of the catalogue of nebulae in 1833, Sir John Herschel determined to undertake a voyage to South Africa, for the purpose of continuing his researches in the southern hemisphere on the same plan as that which had occupied his time in England, and with the same instruments. He embarked at Portsmouth, in company with his family, on November 13th, 1833, and arrived safely in Table Bay on January 15th, 1834, after a pleasant voyage, diversified by few nautical incidents. After a temporary residence at Welterfreiden, he engaged a suitable mansion, bearing the name of Feldhausen, about six miles from Cape Town; a spot charmingly situated on the last gentle slope at the base of Table Mountain. On this spot, within an enclosure—a kind of orchard, surrounded on all sides by trees—a building was erected for the equatorial, while the 20-feet reflector was mounted in the open air.

The labours of Sir John Herschel in South Africa were chiefly confined to seven different subjects of observation. Stellar astronomy, however, occupied his principal attention. Two of the most celebrated nebulae—that in the sword-handle of Orion, and that surrounding the variable star *Eta Argus*—as well as portions of the Milky Way, have been delineated with a particular care. The published drawings of these objects have been acknowledged by astronomers to be the most perfect representations of these beautiful ornaments of the southern sky. The nebula of Orion, magnificent as it is even in England, comes out in much grander detail in the southern hemisphere, where its great elevation in the heavens renders it comparatively free from the ill effects of an impure atmosphere.

Besides many micrometrical measures of the distances of the double stars, Sir John Herschel employed several clear nights in the determination of the relative brightness of the stars. The results are very satisfactory, and are published in considerable detail in his volume. The four last chapters relate to the consideration of the probable distribution of stars in the southern hemisphere; to observations of Halley's comet and of the satellites of Saturn; and, lastly, to a detailed account of the solar spots visible during the latter part of 1836 and the first half of 1837. On May 25th, 1837, an extraordinary spot is recorded to have appeared on the sun's disk; and Sir John Herschel has estimated that the black centre of the spot was large enough to have allowed the globe of the earth to drop through it, leaving a thousand miles clear of contact on all sides of that tremendous gulf.

The record of the site of the 20-feet reflector has been preserved by the erection of a granite obelisk on the spot, raised by the subscriptions of Sir John Herschel's numerous Cape friends, to whom, as well as to the colony in general, he speaks as being attached by a thousand pleasing and grateful recollections of years spent in agreeable society, cheerful occupations, and unalloyed happiness.

On the return of Sir John Herschel to England, in 1838, he was welcomed most truly by the whole scientific world; while the Government, to mark their appreciation of his valuable services, raised him to the dignity of a baronet.

In 1840 a valuable memoir "On the Chemical Action of the Rays of the Solar Spectrum in the Preparation of Silver and other Substances, both Metallic and Non-metallic, and on some Photogenic Processes," was published in the Philosophical Transactions. The royal medal was awarded for this paper, being the third occasion on which that honour had been conferred upon him.

We have hitherto confined our remarks to the principal original researches of Sir John Herschel, which are doubtless the most striking to the man of science; but still there can be no question that his popular reputation has arisen chiefly from his two well-known works, "A Preliminary Discourse on the Study of Natural Philosophy," and "Outlines of Astronomy," both of which contain internal evidence of his great attainments in almost every department of human knowledge, and of his high powers as a philosophical writer. We give a short extract from each of these works as examples of his style; but it is impossible to enter into any account of their contents, for these treatises can be so easily obtained that the reader can judge for himself.

From the first of the above-mentioned works we gather the thoughts of Sir John Herschel on a subject with which he was so intimately acquainted:—"Among the most remarkable of the celestial objects are the revolving double stars, or stars which, to the naked eye or to inferior telescopes, appear single, but, if examined with high magnifying powers, are found to consist of two individuals placed almost close together, and which, when carefully watched, are (many of them) found to revolve in regular elliptic orbits about each other, and, so far as we have yet been able to ascertain, to obey the same laws which regulate the planetary movements. There is nothing calculated to give a grander idea of the scale on which the sidereal heavens are constructed than these beautiful systems. When we see such magnificent bodies united in pairs, undoubtedly by the same bond of mutual gravitation which holds together our own system, and sweeping over their enormous orbits in periods comprehending many centuries, we admit at once that they must be accomplishing ends in creation which will remain for ever unknown to man; and that we have here attained a point in science where the human intellect is compelled to acknowledge its weakness, and to feel that no conception the wildest imagination can form will bear the least comparison with the intrinsic greatness of the subject."

In the "Outlines of Astronomy" we read, "There is no science which, more than astronomy, draws more largely on that intellectual liberality which is ready to adopt whatever is demonstrated, or concede whatever is rendered highly probable, however new and uncommon the points of view may be in which objects the most familiar may thereby become placed. Almost all its conclusions stand in open and striking contradiction with those of superficial and vulgar observation, and with what appears to every one, until he has understood and weighed the proofs to the contrary, the most positive evidence of his senses. Thus the earth on which he stands, and which has served for ages as the unshaken foundation of the firmest structures, either of art or nature, is divested by the astronomer of its attribute of fixity, and conceived by him as turning swiftly on its

centre, and at the same time moving onwards through space with great rapidity. The sun and the moon, which appear to untaught eyes round bodies of no very considerable size, become enlarged in his imagination into vast globes; the one approaching in magnitude to the earth itself, the other immensely surpassing it. The planets, which appear only as stars somewhat brighter than the rest, are to him spacious, elaborate, and habitable worlds; several of them much greater and far more curiously furnished than the earth he inhabits, as there are also others less so; and the stars themselves, properly so called, which to ordinary apprehension present only lucid sparks or brilliant atoms, are to him suns of various and transcendent glory, effulgent centres of life and light to myriads of unseen worlds. So that when, after dilating his thoughts to comprehend the grandeur of those ideas his calculations have called up, and exhausting his imagination and the powers of his language to devise similes and metaphors illustrative of the immensity of the scale on which his universe is constructed, he shrinks back to his native sphere, he finds it, in comparison, a mere point; so lost*—even in the minute system to which it belongs—as to be invisible and unsuspected from some of its principal and remoter members."

In the year 1851 Sir John Herschel accepted the appointment of Master of the Mint. This office had formerly been held by Sir Isaac Newton, but since that time by a member of the House of Commons, a supporter of the existing ministry. From the date of Sir John Herschel's acceptance of office its political character ceased. On account of a long period of ill-health, which excited great uneasiness amongst his friends, he resigned his office in 1855, and retired into private life. Since that time, although his health was ultimately restored, he has only occasionally mingled with his scientific brethren, passing his life in comparative retirement at Collingwood, near Hawkhurst, Kent. That his active mind, however, has been at work, science has had an abundant proof by the publication of his extensive catalogue of nebulae and star clusters, and by other shorter papers which have been occasionally read before one or other of the principal societies.

From the rank which Sir John Herschel has always held among scientific men, his services have been frequently required on committees, boards, or royal commissions whose object was the attainment of information for the advancement of science. It is only necessary, however, to mention in connection with this branch of his labours that he is one of the oldest members of the board of visitors appointed to inspect the Royal Observatory, and to receive an annual report from the Astronomer-Royal on the efficiency of that establishment. He was also an important member of the Royal Commission on Standards, appointed to prepare new standards of length and weight, in lieu of those destroyed in the fire at the Houses of Parliament in October 1834.

In the principal scientific societies Sir John Herschel has filled most of the important offices. As member of the council and one of the secretaries of the Royal Society, he was one of its leading members for years. In

1830, on the resignation of the presidency by the late Mr. Davies Gilbert, a strong effort was made to elect Sir John Herschel to the vacant chair in opposition to the Duke of Sussex, on the ground that his appointment would be peculiarly acceptable to men of science in this and foreign countries. There were special reasons which influenced a large number of the Fellows to support a member of the Royal Family; but, though these reasons were urged most strongly in favour of the Duke of Sussex, Sir John Herschel lost his election by eight votes only, two hundred and forty members being present. In the Royal Astronomical Society he has filled the office of president on three occasions for the usual period of two years each, besides frequently occupying a seat at the council. He also presided over the meeting of the British Association for the Advancement of Science held at Cambridge in 1845. In addition to the above, he is connected with several other societies, both English and foreign.

Sir John Herschel was married in 1829, to Margaret, daughter of Dr. Stewart, of Strathgarry, Perthshire. His domestic circle has consisted of three sons and nine daughters, one of whom is deceased. His second son, Alexander Stewart Herschel, is favourably known in science as the author of several papers on the theory and observation of meteorites, or shooting-stars.



THE HERSCHEL OBELISK, SOUTH AFRICA.

THE MAIN CHANCE.

BY THE AUTHOR OF "CEDAR CREEK," "THE HERROL FAMILY," ETC.

CHAPTER XXVIII.—DOMESTIC.

THE great Ocean Navigation Company was on its legs.

Mr. Lombard regarded it as in this attitude of progress when, after a stiff battle in the House, the subsidy was carried. It may be imagined how, thereupon, the premium swelled and swelled, till (if the company had been a bubble) there might have been a burst and a collapse.

* It was to meet the use which infidelity might make of this ascertained vastness of the material universe that Dr. Chalmers wrote his celebrated "Astronomical Discourses." In that eloquent and able work Dr. Chalmers showed that mere magnitude has no relation to moral properties. In the vastness and variety of creation the power, wisdom, and goodness of God appear; but in the salvation of sinful men by a Redeemer there is a manifestation, before all worlds, also of the holiness, justice, and mercy of God. Any objection about the narrowness of the theatre of this display of the Divine attributes carries along with it all the grossness of materialism.—ED. L. H.

So there was a hurrying in the dockyards; and because the steamers that had been ordered were not ready, one was chartered to proceed with the Brazil and Azores mails without delay. Everything with which Mr. Lombard had to do was promptly performed. Men predicted great successes for the company. The press saluted it with a pean of anticipated triumph. Even "The Leinster Rapparee" had a good word for the project, though seasoned with gibes about the Saxon subsidy. And great was the excitement on the day when first an ocean liner was seen afloat on the wide waters of the estuary below Dunamase. Greater, if possible, was the excitement on the day when that ocean liner fairly set out on its voyage to Rio. Flags floated from every pinnacle in the town. The temperance and militia bands played national airs from day-break forth. Everybody put on his or her best clothes; the country-people flocked into the streets, and lined the quays and beach. All the bells rang from church and chapel, in many varieties of tone and semi-tone. The mail-bags were treated to a sort of ovation, and the hero of the day was decidedly the mail-agent. When the little black tug which acted as tender was seen steaming forth towards the ocean liner, vast was the applause which rent the air from thousands of throats, the most part whereof knew not why they applauded. And yet there was good reason: this day might begin a new era in the commercial activities of Ireland.

Away steamed the splendid packet, her halliards streaming with colours—past the clustering woods of Castle Lough, which seemed in one spot to part asunder naturally to give a view of the fine mansion, and past various white country-seats and white villages, the population becoming more sparse towards the sea, and the land less green. Also, more rocky islets dotted the entrance of the estuary; and to the west there lay a very dangerous reef, where, on the calmest day, snowy surf broke incessantly. At the other side were the long low banks of the reclamation which had brought Mr. Lombard so much money. More reclamation was being carried on still, and on a larger scale. Success had emboldened the projector and engineer; and again his opponents said that the enterprise was foolhardy. He was venturing too far; a December storm from the west would ruin the whole.

The rocky point nearest this reclaimed land was crowned with a lighthouse, which, after sunset, flashed forth a fixed red light, to mark the entrance to the estuary. Now it stood pallid in the declining day, which had become overcast, and looked angry to seaward; long grey waves were rolling from the west, and, as the steamer addressed herself to her hard work, she cast off her holiday garb of colours, and went head foremost at the rough Atlantic.

A solitary horseman's figure might have been seen standing on the farthest reach of the embankment, looking out to sea. All he had to behold, beside the long grey waves and low grey clouds, was the trail of black smoke from the steamer's funnel and her own dark diminishing outline. Turning his horse, he walked slowly along, pondering some of his plans, pausing occasionally to scan the progress his workmen were making. Work was, with the labourers, over for the day: not so with the master-labourer who paid them all. Yet he had got a great piece of business off his mind that afternoon, when the ocean liner made her first start in the employ of the Universal Navigation Company.

He put El-Dorado into a trot on debouching from the embankment into a narrow road, leading past two or three small neat cottages, and so to the main road.

These were cottages belonging to the coastguard men, and a big ugly boat-house was built alongside. The cottages were, as is customary with such, very small indeed, and very neat indeed. Little bits of garden in front had rows of the latest peas withering on the rods, and a few lettuces and turnips—vegetables on a very confined scale, but plenty of parsley-edging everywhere, and a corner of sweet-smelling mignonette. The walls were snow-white, the roofs blue-slated, the doors and windows cleanly painted. Mr. Lombard had seen them and their neatness five hundred times; but he looked at the man and woman who were standing at the gate of the first.

The man was in the ordinary coastguard undress of blue jacket and gilt buttons, with the unfailing telescope under his arm in a case; a middle-aged salt, who had seen service in many seas, doubtless, and was brown as a nut. The woman, middle-aged likewise, had a little child in her arms; a boy who somehow reminded Mr. Lombard of one of his own that had died long ago, and over whom he had erected the angel gathering rosebuds.

But the woman's face—that reminded him of something else, yet of what precisely he could not tell. Perhaps he had seen her somewhere before: a stout-built woman, with a face that had been pretty, until plumpness grew about the small features and drowned them. Just such a woman as one would say had been a sylph in youth, though large enough for half-a-dozen sylphs now. Mr. Lombard did not check his horse in riding by; he bowed in return to the coastguard's respectful salute and his wife's curtsy, and was quickly out of sight at an angle of the narrow road.

"The new coastguard people, I suppose," he reflected. "But where can I have seen the woman before?"

Not able to discover by investigation of his memory, he concluded that she was only like some person he had seen; and so put by the matter. Of course he had things of much more moment on his mind; and he was going next day to London concerning such.

Home to a late dinner, served with the usual splendour which his wife liked and exacted, but which he abhorred—at least so far as its formalities were concerned. Yet it was all the purchase of his wealth; and, like other things so purchased, he had found it not worth the cost. Pen had a particularly gloomy brow this evening; and any remark of his was answered in a manner sufficiently chilling to be even noticeable by the attendants. And Mr. Lombard, as he not unfrequently did, rose after he had eaten a slice or two of mutton, saying he was very busy, and went to his study; leaving the French *entrées*, and second course, and dessert to be enjoyed by his wife and Esther alone.

"I fear papa is not well," said his daughter, timidly, and colouring very much, as he left the room. She really wished to cover the unpleasantness before the servants.

"Not at all, dear; he is only out of humour," returned Pen, who seemed to recover her own good-humour in his absence. "Don't you understand his face by this time? Never mind; he will recover by-and-by."

Esther felt more ashamed than ever. Long ere this she had learned how hard and unloving his wife could be to her father, and in her weakness and unhappiness had nothing to do but pray about it. After a little time in the drawing-room, Pen rose and said she was going to speak to Mr. Lombard. But, had Esther been a very close observer, she would have seen the hardness that came into the lady's eyes and the proud curve into her lips as she said so.

"Oh, it is you, Pen? you are welcome. I think I've

seen you in this study only twice or thrice before since we've been married," he observed, rising with alacrity to get her a chair. "I hope, since you've found the way, you'll come oftener in future."

"Perhaps you will not desire it after I have said what I came to say." She would not sit down, but stood with her hand on the back of the chair; and her tone was very measured, as of one uttering prepared words. "What is the meaning of this, Mr. Lombard?"

She reached towards him the sort of shabby letter, directed in schoolboy writing, and with "Privat" ostentatiously at the top; with the stamp in the wrong corner, and every mark of illiteracy—the shabby sort of letter that he knew well.

And she watched him while he read it; for he did so before he said a word. It informed her, in bad English and worse spelling, that her husband had committed a great crime, to the writer's knowledge; a crime committed long before Mr. Lombard had ever seen her or (as was expressed with a certain needlessness) married her; a crime which, if ever discovered, would render him amenable to the law, and disgrace him for ever, as he deserved to be.

"That's a lie," exclaimed Mr. Lombard, curtly. He referred to the fact that discovery would entail beggary. He knew that, even if Mr. Estridge's heir were alive, he could claim no more than his father's property and its accumulated profits for the years that had passed since the old man's death. But Mr. Lombard was willing that his exclamation should be taken to mean that the whole allegation of the shabby letter was a lie; and he saw that this construction certainly relieved his wife's fears.

"I am surprised that you could believe such a tissue of falsehoods," he said, turning the letter round like a curiosity he would fain inspect. "I hardly deserved this from you, Pen!"

"It terrified me," she said, with her hand on her heart. "I don't think you read the postscript."

Which stated the writer's ability to shield Mr. Lombard from the consequences of his crime, provided the writer were well paid, and requested that Mrs. Lombard would lay the matter to heart, and procure the money for her "trew frend, John Green."

"The scoundrel!" hissed Mr. Lombard between his teeth. "Such a stab in the dark!"

"Then there really is a John Green," she said, her face hardening again.

"Of course, else the letter would not have been written," he replied.

"And he has you in his power?" she asked.

"Most certainly not, nor ever will!" answered her husband vehemently. "But I'll not stand being questioned thus," and he rose up; "such suspicions are dishonourable and degrading both to me and to yourself, Pen!"

She did not move, but the icy glitter in her eyes became keener than ever.

"Mr. Lombard, you shall not deceive me," she said. "There is some mystery in the knowledge of you and of this man—some wretched crime—I know not what. It is not this evidence alone—I have the evidence of your own disquiet. You look this moment like a guilty man—you never look like a happy man, or a man with an easy conscience. Do you recollect talking of ruin once? You know that you dare not at this moment open up all your former life to me!"

"No," he said at once—"No. It is not fit for the inspection of so grand a lady. You would not like to hear of your husband having swept out a shop?"

"Pah!" she uttered, with a restless motion of her head. "You know well that I should care little for that. It was at least honest. O Ralph, Ralph! bitterly am I punished for my crime, for my folly!"

"You have given me to understand, on a previous occasion, that you regretted that step," said he, coldly. "As it cannot be undone, you had better say no more about it; and of course you are prepared to believe any lie that any scribbler chooses to tell you concerning your husband."

"Will you explain this to me?" she said, pointing to the shabby letter as she choked back her tears.

"There is nothing to explain," he replied.

"And I am to believe what the man states?"

"As you please. I rather think you have chosen your belief already. I have told you it is a falsehood, which is all I have to say."

She bowed, with an excess of ceremony, and swept from the room, saying not a word more. Esther did not see her again that night; Mrs. Lombard's French maid brought word to the drawing-room that her mistress had a bad headache and had gone to bed. Fifine herself had been shut out from her accustomed duties, and conjectured, in her shrewd little black head, as she made up in the privacy of her own apartment one of those "coiffures ravissantes" (Anglise, bewitching little caps) which stole the hearts of the male servants, and were the despair of the female—conjectured that madame "étais de mauvaise humeur" because of some *fracas* with monsieur. And so Mrs. Lombard's stratagem deceived nobody. Patent to the very scullery-maids was the skeleton of domestic unhappiness.

Mr. Lombard had advisedly taken up his high tone on this occasion; a rapid glance at the facts had convinced him that any consistent explanation was impossible. But his reflections were not very enviable thereafter.

CHAPTER XXIX.—WHERE HE HAD SEEN HER.

The coastguard's wife had also recognised the gentleman on horseback. She told her husband who it was, before he came abreast of the houses. "But he won't know me a bit; see if he will," she added.

"Well, my lass," said the coastguardman, after that consummation had come to pass as she predicted, "he wasn't told as you'd turn out the build of a Dutch cheese, was he?" and he laughed as he swung the little gate behind him, and turned to walk up the lighthouse hill on his usual evening inspection of the sea and headlands with his glass.

The wife laughed good-humouredly also, and held a little conversation with the child in her arms on the subject, asking him, albeit speechless, whether it was true, if he thought mother indeed like a Dutch cheese, and hugging him enormously when he responded with a fat sleepy smile. "The little man thinks it's time to go to bed," quoth she then, by way of soliloquy; and, taking him indoors, she undressed and rocked him to sleep in her arms, after the affectionate manner of Irish mothers, before laying him in the wicker cradle.

That accomplished, she put her foot on the rocker, and continued the lullaby mechanically with her lips, while thinking of other things. The sight of Mr. Lombard had roused a whole host of memories. She had known that this coastguard station was in his neighbourhood; for he was so rich, and employed so many, had his name in numerous mouths; but seeing him was quite a different matter from hearing about him. She remembered former days at Ballyshingle (this was the village on the Bay of Dublin), days in Mr. Estridge's

house, the decease of its young mistress, the government of Hannah Rickaby as nurse to the little heir: how they used to twit Hannah, being elderly, with her younger lover, and how gratified Hannah was to be so twitted, while she pretended affront; how they were both thrown out of employment by the child's death; and so on.

"Dear me, but how short ago it all seems! an' sure it's a matter of sixteen year, at all events. An' I've the bread to make yet."

Thus recalling herself to the practicalities of life, she scooped brown flour from a bin behind the door, and began to knead a flat cake for supper, with buttermilk and soda as fermenting elements. A big slouching boy came in before she had ended.

"Mother, I met a gentleman on horseback, an' he asked me the name of the new coastguard, an' I told him 'twas father."

"Perhaps he knew me after all," thought the woman, with some gratification, as she scored over her flat cake with a table knife into oblong slices. "Dear me, but it brings back old times wonderful entirely! Now, Sam," she added aloud to the boy, who had taken a book and set himself down before the fire, "mind this bread for me, an' don't let it be burnt, or I promise you you'll have to eat all the blackened 'squares' yerself."

Whence it will be perceived that she was a woman capable of household government with the sanctions of a wholesome stringency and evenhanded justice. Unfortunately Sam, who was rather of a bookworm, as far as his limited opportunities allowed, became so absorbed in some old volume as (like King Alfred) to forget his charge; and we may record that the threatened result, his eating all the burnt crusts, was rigidly fulfilled.

"Sam," said the wife to the elder person, who bore that name, after she had sat silent at her sewing for a long time, later in the evening, while her husband conned a newspaper (a fortnight old) lent him from the lighthouse—"Sam, I'd like to write a letter to the old place."

"What for?" he asked, having never known her to entertain such an idea before. "Is it to Ballyshingle?"

"I'd like to hear about the neighbours," she answered to the former question. "They've been greatly on my mind to-day."

"Well, write it," said he, with a chuckle. The pleasantries consisted in the circumstance that she could not even sign her name.

"No, Sam, you'll write it for me, like a good man," she rejoined. He answered nothing till he had gone through a paragraph concerning a sea-serpent five hundred yards long, seen by credible observers in the "horse latitudes;" whereupon he observed, briefly, that he didn't believe a word of it.

Having commenced her attack in this insinuating manner, and returned to the charge frequently, she had the letter an accomplished fact in the space of about ten days.

"And now," said her husband, throwing down his pen, "why didn't you get your son to write it? He writes every bit as well as I do."

"I never thought of Sam," she responded. It was true. That youthful prophet had no honour, as yet, but rather opprobrium, for scribbling in every direction, and for his ultra-bookish tendencies. "He'll never do for a sailor," his father had said, as the very acme of hopelessness concerning him. "He's fit for nothin' but drivin' at books and pens."

"That mightn't be so bad, after all," his mother had ventured to say. But, as the winter rolled on, and Sam grew taller and more slouching, and affirmed one day

that he knew as much as the schoolmaster, the question of what to do with him, remuneratively, became every month of greater consequence.

"If I could ever be a messenger-boy—or—a clerk," said he, his great face reddening as he expressed, presumptuously, his high ambition. "I mean a clerk by-and-by, when I'm a man," he added.

Then it was that the thought of appealing to Mr. Lombard, to put him in a way of employment, suggested itself to the coastguardman's mind. "I don't see why he shouldn't do it for them as he knows," the elder Sam observed. "Sure he wants messenger-boys and clerks always! Isn't it as good, an' better, for him to have them as he knows?"

The wife hung back. In her name the appeal would be made, and she naturally felt that she had no claim whatever to urge; and perhaps no pretty slender girl of former years likes to step forward and exhibit herself as the consolidated matron of rubicund forty-five.

However, her objections were overcome; and one breezy day in March they set out for the town and Mr. Lombard's office—herself, her husband, and the youthful aspirant their son. The lighthouse people (good neighbours) had lent them a sort of small car, called a "fly-car," drawn by a hardy little pony, and on which the three fitted with management; Sam the elder chuckling as his wife easily took up the entire of one side. They alighted outside the town, and put up the vehicle at a "stage;" and then Mrs. Sam, having shook out her Sunday gown (till now carefully pinned up), and her husband hitched his waistband tighter and blue jacket straighter, they inquired the way to Mr. Lombard's office.

"Leastways, not wanting to incommod the gentleman." Such was the form of the coastguard's protest against giving trouble, as, very red and very faint-hearted, the worthy couple followed the junior clerk along the outside passage of the counting-houses into a sort of outer office, while he went to tell the great man who it was that wanted an interview. Young Sam, who had received many tutorings beforehand, was here finally touched up by instructions from his parents how to make "a pretty bow;" which instructions left the hapless youth in a disorganized state of mind, and with hair inclined to the erect position.

"It's Fanny Kenrick, sir—though leastways she's married to me now, an' has another name, as in dooty bound," said the coastguardman, blushing through his bronze when the interview arrived. And then he made his request. Mr. Lombard scarcely heard it at first, for thinking how the query was solved, of where he had seen that woman before.

"Ah, I remember. You were in my service—in Mr. Estridge's service for a time. I think you were at Shamrock Villa when the poor little fellow died?"

"Yes, your honour, sir :" for she was an Irishwoman, though her husband was Manx. "The blessed baby, an' he walkin' about so pretty, an' the blackest eyes I ever saw. Ah, we were mortal fond of him, Hannah an' me."

"Well, well," said Mr. Lombard, hastily, and hoping her memory was so minute only for a special purpose, "of course I like old acquaintances, and shall do what I can for your boy." He wrote his name in a pocket-book. "I ride round by your station sometimes to the works, and shall call in some day. Good-bye"—and the interview on which Sam's fortunes were to be built was ended.

"He'll never think of us again. That's the way wi' them grand folks," said the coastguardman, speaking

over his shoulder to his wife as they walked off. "We might as well ha' stayed at home."

And whether it was his own grumpy humour or not, he saw in the heavens all sorts of bad weather, when their faces were set seaward again. The breeze had stiffened since morning, and brought on its wings a strong odour of brine and a loud sound from distant breakers, as they neared the lighthouse point. Nay, one might have thought it rained, from the gusts of spray that were hurled inland. The pony held down his head, and beat slowly against the force of the wind and wet.

"As ugly a night as I'd wish to see," said the coast-guardman to another who came up, and staring at a stranger that walked in his wake.

"This gentleman's been a-waitin' best part of the day," said his neighbour: "come a long way to see your wife, he says. Mr. John Green, of Australia."

RUSS PICTURES.

VI.—URAL FISHING.

THREE principal fishing-seasons now exist in the Ural, in which all the Cossacks take common part. The time and place of the catch, the size of the implements, and all the arrangements upon these occasions are exactly laid down by regulation, and carried out with military precision. The spring and autumn fisheries are both conducted with nets; but the third and most remarkable is the winter fishing beneath the ice, with poles four to five fathoms long, to whose lower extremities are attached strong iron semi-circular hooks, ground sharp.

When the spring take is impending a captain of the fishery is chosen from among the senior staff-officers, charged with the care of the arrangements and the settlement of disputes, and to whom the strictest obedience is due. A certain space of the river is daily allotted for fishing, and this limit must be overstepped by none. As soon as the boundary is reached a signal is given, and the fishery ceases. All then repair to the camps upon the bank, where Russian merchants are in waiting to purchase the take, salt it down, and despatch it in carts drawn by rapid horses into the interior of the empire. At dawn a new space down the course of the stream is measured off, generally to the spot where the tent of the fishing-captain has been set up. So day by day the sport proceeds until the Caspian is reached. At this season only sevrugas and a few salmon are to be taken: sturgeon and huso must be thrown back into the stream.

The autumn catch begins in October, about two hundred versts below Uralsk, and proceeds downwards to the Caspian. The order of procedure is exactly similar to the spring fishery, except that far stouter nets are used. The river presents a lively sight at these times. Far as the eye can reach the stream is covered with light baydars—slight canoes, each usually occupied by a single man—shooting hither and thither with lightning velocity; the nut-shells trying to anticipate one another, as far as the regulations permit, in the boldest and most rapid curves. Every now and then a fisherman, less skilled than his fellows, plumps over with his bark, swims round it until righted, then clammers in and tries his fortune anew. The quick determination, activity, and hardiness the men display in every motion requiring enterprise are truly admirable. They would make excellent sailors if the Caspian were not an inland lake. It is evident, however, that in this free, wild, yet disciplined fisher-life the Cossack obtains valuable

military training, acquiring the rapid eye and resolute self-reliance so essential in the field.

As soon as the river begins to take a light crust of ice in late autumn, which generally happens at the end of November or in December, the fish seek the deeper portions of the stream to pass the winter undisturbed. But, as the bed of the Ural is annually changed by the currents, so that the remoter retreats of the fish cannot be always known, before the frost sets in the men observe the places where they play upon the surface, or, waiting until the river is frozen, they lie down upon the thin transparent ice, cover their heads with a dark cloth, and can then see the great forms of the fish resting tranquilly upon the bed. These tokens they seek to turn to account when fishing-time arrives.

The preliminary winter fishery generally commences while the ice is still extremely slight, and lasts usually a single day. Upon this occasion a certain chosen number only are permitted to attend; the object being, according to ancient custom, to forward a quantity of the choicest fish, with the finest caviare, as a present to the Imperial Court. For this purpose an officer is in waiting on the bank with nine light three-horsed carts. The fish and caviare are packed in all haste, and the convoy rattles off day and night, as fast as the swiftest horses can gallop, to St. Petersburg, whence the deputation invariably returns richly laden with gifts.

The second winter fishery, or little *bagrénie*, always begins before Christmas, lasts a week, and terminates at a distance of eighty versts from Uralsk. The third take (great *bagrénie*) commences where the second ceased, and ends at about two hundred versts from the town.

Every ordinary Cossack fishes for himself with a single hook, each man receiving only one permit. Officers and functionaries are more highly favoured. These latter, if not desirous of partaking of the sport in person, may hire representatives. This arrangement in no way prevents a number of Cossacks, who have permits, combining in a species of copartnership, and sharing the spoils. In addition to the large hook above mentioned, each man is furnished with several smaller hooks attached to short poles, wherewith to pull out the fish when fast, a shovel, and an iron bar to break the ice. In former times the arrangements differed from those in vogue at present. All the implements were placed upon sledges, drawn by spirited horses. Thousands of these vehicles were placed in lines, waiting for the signal that the fishery was open, then racing off to secure a favourable place. The thunder of the chase resounding on the ice startled the fish from their resting-places. Accidents, however, being of frequent occurrence, the practice was given up.

As the day appointed by the captain for the commencement of the sport draws near, the general excitement and joy are impossible to describe. Many a Cossack is unable to sleep the previous night, and is up with the dawn. With the first rays of light the inhabitants set out for the spot where the fishery is to begin. Russians of the lowest class and Kirghises follow. These men are hired to look after the horses, to set up tents, kindle fires, and execute all tasks not immediately connected with the fishing, which the Cossacks reserve for themselves. Next come numbers of Russian merchants from Uralsk and other places, with their carts and attendants. These always accompany the sports, purchase the take of the Cossacks as soon as it is brought to the surface, extract the caviare, salt it, and head it up in casks. The fish themselves, after the

sounds and air-bladders are removed, are either allowed to freeze upon the bank or also salted, to permit of more rapid transport. Simultaneously with the traders, the procession is attended by numerous sutlers, who set up their slight booths upon the bank for the sale of oats, hay, bread, pastry, nuts, tea, and brandy.

As soon as this long procession of men and animals has reached the banks of the river, a number of light tents and similar structures rapidly arise; but, as they accompany the downward progress of the fishers from day to day, they are not calculated for durability. The utmost activity now prevails in the temporary camp; the banks are crowded, and the scene resembles the exodus of a mighty nation. Finally, all have found a place, the signal-gun is planted, and the artillerist stands at its side with burning portfire. The Cossacks next receive orders to range themselves in line on either bank of the river, to await the warning shot. Each man carries his fish-hooks and crowbar, and takes up his post wherever he can find room, or thinks he is opposite to a spot yielding wealth of fish.

When all are placed, and both banks of the Ural occupied by Cossacks, the captain of the fishery issues from his tent and advances slowly to the centre of the river, upon which no Cossack dare venture before the signal-gun. The utmost silence is preserved. All are filled with expectation, and leaning forward with half-bent bodies, ready for a spring. Their faces glow with excitement; their eyes are either bent upon some previously-selected spot, or turned towards the captain, who is to give the sign. But the captain is not in the slightest hurry. He paces backwards and forwards between the banks, and makes all sorts of motions to mislead the Cossacks. If the military hetman happen to be present, off goes the captain's shako with a deferential bow to his superior. At last, after long teasing, he gives the appointed sign, and the gun is fired.

Before the smoke has cleared away from the muzzle, a tumult arises resembling Bedlam broken loose. The entire mass of Cossacks rush in a body upon the ice. Every man makes with furious haste for the spot he has already selected in his mind; or, if another has anticipated him, for some other, as hurry, or accident, or space permit. Thousands of small holes, a foot or two in diameter, are broken through the ice in a moment; in places where many fish are expected, not more than three or four paces apart. Next rises a forest of long poles furnished with hooks, which are lowered into the holes to a distance of a couple of feet or so from the ground, and held in waiting for contact with a fish. The moment this is felt, the pole is drawn upwards with a rapid jerk, the sharp hook catches in the belly of the fish, and it is fast. The hole is now enlarged, the fish drawn up until it can be reached by the smaller hooks and pulled out upon the surface. The rapid hurrying to and fro and shouting of the men, the crashing of the ice-holes, and the thousands of lengthy poles suddenly introduced into their retreat, frighten the fish from their lairs, and send them in wild confusion upon the hooks. The ice speedily becomes slippery with gore. Hillocks of fish rise rapidly upon the banks; and, as soon as booty is hooked, the eager faces of the traders are peering over the fisherman's shoulder, and offering to buy it at a price.

This often happens, even while the prey is still beneath the ice and its size unknown, in which case both buyer and seller trust to blind fortune. At times a long-nosed schipp, or huge shad, weighing say five or six pood, will be struggling upon the hook deep beneath the ice. But, as the shad is of little value, and furnishes

no caviare, a skilful fisherman, aware what he has taken by the yielding of the softer flesh, will offer his catch to an inexperienced purchaser, and exert his utmost powers of persuasion. If the trader hesitate, the pole is thrust into his hand. He feels the great fish struggling vehemently upon the hook, his cupidity is aroused, he fancies a mighty huso (*Accipenser huso*, the great sturgeon) awaits him, makes his offer, and finds himself bewrayed.

The most cautious and difficult to entrap are the large huso, from fifteen to twenty pood (800 lbs.). When a Leviathan of this kind is startled by the tremendous noise and tumult with which the ice reverberates, he often rises to the surface to see what the hubbub is about. If, in so doing, he brush against a pole two or three fathom below him, extraordinary rapidity and skill are required to fix him on the hook. A fish of this size often snaps several poles like reeds, and is only overcome by multiplicity of foes. A big fellow like this yields from 100 to 130 lbs. of caviare.

This singular species of fishery possesses a remarkable charm for the observer, and displays in a striking light the hardiness of Cossack habits. Supposing, for example, that during severe frost an iron crowbar falls through one of the ice-holes into the stream, little fuss is made about the matter. The owner of the bar strips, his comrades sling a rope round his body, he dives to the bottom, and is drawn up again with the bar. He throws on his clothes, crosses himself, perhaps tosses off a glass of brandy, then continues his fishing as coolly as if he had done nothing to be astonished at.

The fishery last December presented features of peculiar interest. It was high time to get ready the present for the Imperial Court; but the Ural was not entirely frozen over, and large open patches of clear water occupied the middle of the stream. Attempts were made to fish, but fish declined to be caught. At last a Cossack observed a number of fish, startled by the noise, showing near the surface of the open water; but how to get at them? Without much hesitation a clump of ice was hewn off from the edge, a sturdy Cossack seated himself upon it, and pushed out boldly into the centre of the stream. Fortune aiding, he presently contrived to hook a large fish; but then his troubles began. From his insecure position the man was quite unable to control the struggles of his prey, which floundered about until it finally dragged him off the ice. The Cossack held on manfully to his pole, paddling about as well as he could, and making for the brink. Arrived here, a long hook was cautiously thrust into his clothes, and man and fish together drawn in triumph to land. The feat having proved so successful, a larger block of ice was detached, upon which several Cossacks sprang, and from this floating foundation managed to secure a considerable take. The task was arduous, but the present was made ready in time.

When the captain orders fishing to cease for the day, all repair to camp, where eating and drinking, buying and selling, salting fish and making caviare continue till late into the night. The adventures of the sport are lived in fancy o'er again; song, music, and dancing chase away the hours. So on, day after day, until the entire space apportioned has been thoroughly searched, and all have gained more or less profit.

The fishery is then closed, and will not recommence until spring, when new shoals of fish throng upwards from the Caspian, bringing bounteous store of food and wealth to the doors of the Cossacks from the Giver of all good.

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